Notice No.5

Rules and Regulations for the Classification of Ships, July 2020

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: June 2021

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Part 3, Chapter 1, Section 5	1 July 2021	1 July 2021
Part 3, Chapter 1, Section 6	1 July 2021	N/A
Part 3, Chapter 3, Section 5	1 July 2021	N/A
Part 3, Chapter 4, Section 8	1 July 2021	N/A
Part 3, Chapter 9, Section 10 (New)	1 July 2021	N/A
Part 3, Chapter 10, Section 2	1 July 2021	1 July 2021
Part 3, Chapter 11, Section 9	1 July 2021	N/A
Part 3, Chapter 12, Sections 2 & 3	1 July 2021	N/A
Part 3, Chapter 13, Section 8	1 July 2021	N/A
Part 3, Chapter 14, Section 1, 3, 5, 8, 9	1 July 2021	N/A
Part 4, Chapter 1, Sections 3, 9 & 10 (New)	1 July 2021	N/A
Part 4, Chapter 2, Section 7	1 July 2021	N/A
Part 4, Chapter 6, Sections 1 & 2	1 July 2021	N/A
Part 4, Chapter 8, Section 11	1 July 2021	N/A

Part 3, Chapter 1
General

■ *Section 5*
Information required

5.3 Plans to be supplied to the ship

(Part only shown)

5.3.1 A Ship Construction File is to be provided on board of the ship containing information to facilitate inspection/survey, repair and maintenance. As a minimum it is to include the following documentation and plans:

(e) Electrical cables schedule of watertight penetrations (e.g. cable transit seal systems register).

Existing listed items (e) to (o) have been renumbered (f) to (p).

■ *Section 6*
Definitions

6.10 Damage waterlines

6.10.1 The equilibrium waterline is the waterline in still water when, taking account of flooding due to an assumed damage, the weight and buoyancy forces acting on a ship are in balance. This relates to the final floating position, *see Figure 1.6.3 Damage heel angles*, when no further flooding takes place or after cross flooding is completed.

6.10.2 The intermediate waterline is the waterline in still water, which represents the instantaneous floating position of a ship at some intermediate stage between commencement and completion of flooding when, taking account of the assumed instantaneous state of flooding, the weight and buoyancy forces acting on the ship are in balance. The deepest intermediate waterline corresponds to the maximum intermediate heel angle, *see Figure 1.6.3 Damage heel angles*.

6.10.3 The intermittent waterline is the waterline in still water, which represents the instantaneous floating position of a ship corresponding to the intermittently immersed heel angle. The intermittently immersed heel angle, *see Figure 1.6.3 Damage heel angles*, is the heel angle corresponding to the maximum range in the damage condition.

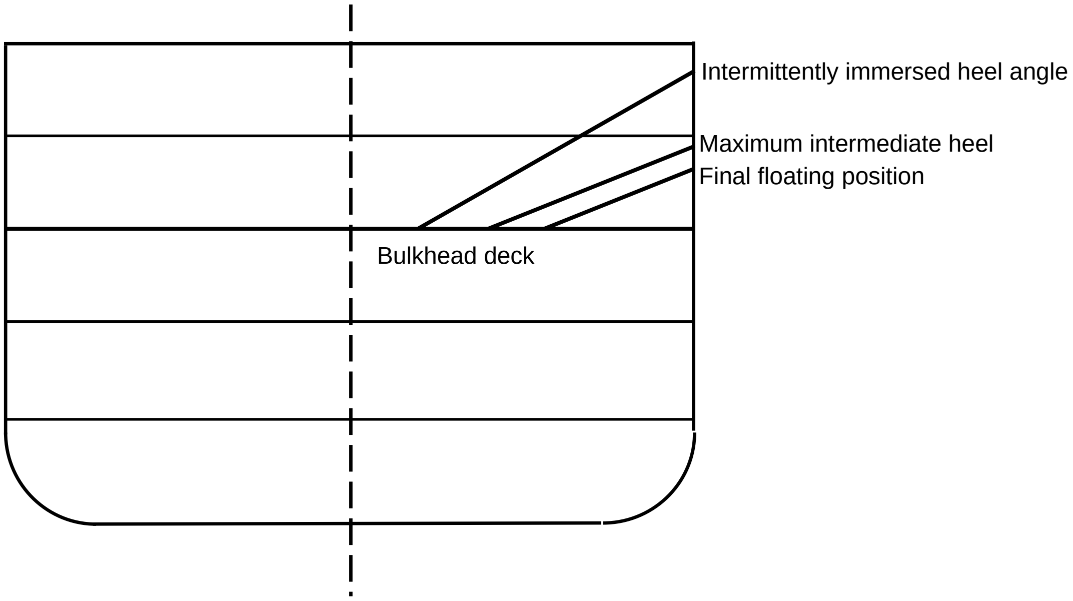


Figure 1.6.3 Damage heel angles

5.5 Flooded loads

5.5.1 The distance to the flooded load point, z_{FD}, is to be calculated as follows;

$$z_{\mathrm{FD}} = T_{\mathrm{f}} + \Delta T_{\mathrm{h,t}}$$

where

$\Delta T_{h,t}$ is the increase in draught due to heel and trim, in metres

$$\Delta T_{\mathrm{h,t}} = \sqrt{\Delta T_{\mathrm{h}}^2 + \Delta T_{\mathrm{t}}^2}$$

ΔT_h is the increase in draught due to heel, in metres

$$\Delta T_{\mathrm{h}} = y_{\mathrm{h}} \tan\theta$$

y_h is the distance from the centreline to the load point, in metres

θ is the heel angle, *see Table 3.5.2 Flooding angles and coefficients*

ΔT_t is the increase in draught due to trim, in metres

$$\Delta T_{\mathrm{t}} = x_{\mathrm{t}} \tan\varphi$$

x_t is the distance from 0,5*L* to the load point, in metres

φ is the trim angle and is given by

$$\varphi = \tan^{-1}(0{,}01\chi)$$

where χ is given in *Table 3.5.2 Flooding angles and coefficients*

T_f is the flooded draught, in metres, to be taken as

$$T_{\mathrm{f}} = \phi T$$

ϕ is the flooding factor, *see Table 3.5.2 Flooding angles and coefficients*

T is the summer design draught, in metres

see also Figure 3.5.4 Damage waterline at any location

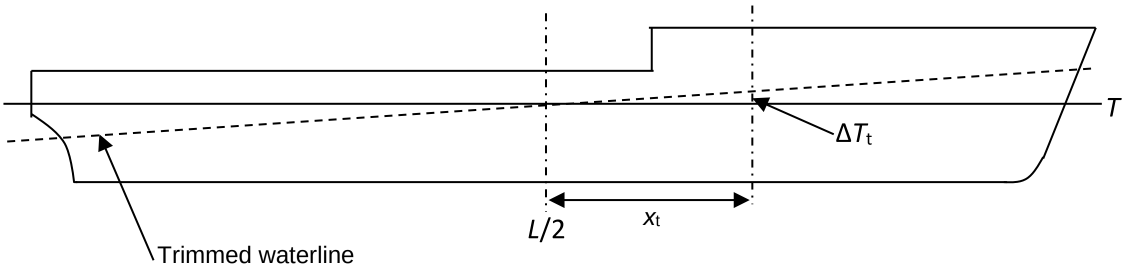
5.5.2 For passenger ships, where the damage waterlines, *see Pt 3, Ch 1, 6.10 Damage waterlines*, have not been provided, the distance from the baseline to the deepest equilibrium/intermediate waterline, whichever is the greater, and the intermittent waterline can be estimated in accordance with *Pt 3, Ch 3, 5.5 Flooded loads 5.5.1* using the flooding angles and coefficients given in *Table 3.5.3 Flooding angles and coefficients for passenger ships*. The flooded load point is to be measured perpendicular to the damage waterline.

Table 3.5.2 Flooding angles and coefficients

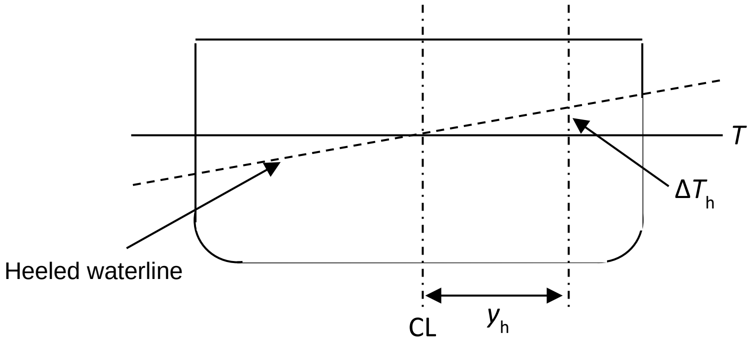
Ship type	Heel angle, θ	Trim coefficient, χ		Flooding coefficient, ϕ	
		Forward	Aft	Forward	Aft
General cargo ships	30	2	3	1,10	1,10
Container ships	30	1,5	2	1,05	1,05
Ore carriers and bulk carriers	30	3	1,5	1,05	1,10
Ro-Ro cargo ships	30	3	2,5	1,10	1,30
Gas Carriers	30	1	2,5	1,10	1,05
Tankers	30	1	2	1,05	1,05
Special purpose ships carrying 200 personnel or fewer, *see* Note 1	12, *see* Note 2	2	2	1,10	1,10
Other cargo ships	30	3	3	1,10	1,10
Note *1*	Special purpose ships are as defined in the *Code of Safety for Special Purpose Ships – Resolution A.534(13)*. For special purpose ships carrying more than 200 personnel, *see* *Table 3.5.3 Flooding angles and coefficients for passenger ships*				
Note *2*	The heel angle is to be taken 7 degrees for locations aft of 0,5*L*				

Table 3.5.3 Flooding angles and coefficients for passenger ships

Ship type	Final/intermediate heel angle, θ	Intermittent heel angle, θ	Trim coefficient, χ		Flooding coefficient, ϕ	
			Forward	Aft	Forward	Aft
Ro-Ro passenger ships/ferries	15	26	3,5	3,5	1,15	1,15
Multi-decked passenger ships	15	22	0	0	1,15	1,15
Other passenger ships and ferries	15	22	0	0	1,15	1,15
Special purpose ships carrying more than 200 personnel, *see* Note	15	N/A	0	0	1,15	1,15
Note	Special purpose ships are as defined in the *Code of Safety for Special Purpose Ships – Resolution A.534(13)*					



Increase in draught due to trim



Increase in draught due to heel

Figure 3.5.4 Damage waterline at any location

5.5.3 The heel angles and flooding coefficients given in *Table 3.5.2 Flooding angles and coefficients* are based on one compartment damage. If required by the Owner, additional flooding can be considered where the flooded load point is to be determined based on the equilibrium damage waterline resulting from the damage stability calculations, *see Pt 3, Ch 1, 6.10 Damage waterlines*. The flooded load point is to be measured perpendicular to the damage waterline.

5.5.4 Where the damage waterlines, *see Pt 3, Ch 1, 6.10 Damage waterlines*, have been provided by the designer, the methodology used to determine the damage waterlines is also to be submitted as supporting information.

Part 3, Chapter 4
Longitudinal Strength

■ *Section 8*
Loading guidance information

8.4 Onboard lashing program

8.4.1 ~~An~~ On container ships an approved onboard lashing program to calculate forces acting on the container stowage arrangement ~~may~~ is to be provided, ~~*see*~~ complying with *Pt 3, Ch 14 Cargo Securing Arrangements*. This may be an extension to the loading instrument covered under *Pt 3, Ch 4, 8.3 Loading instrument*. ~~If the software to carry out lashing calculations is installed and maintained in accordance with the Rules, t~~The ship will be eligible to be assigned the special features notation **BoxMax**, with one or more of the supplementary letters **V** and **W**. The notation **BoxMax(V,W)** may be supplemented with the letter **L** if the conditions for this notation are satisfied. **BoxMax** may be supplemented with the letter **M** if the conditions for this notation are satisfied.

8.4.2 Special consideration may be given to waiving the requirement for an onboard lashing program as required by *Pt 3, Ch 4, 8.4 Onboard lashing program 8.4.1*, e.g. For smaller container ships where the container securing arrangements are relatively straightforward.

Existing paragraph 8.4.2 has been renumbered 8.4.3.

~~8.4.3~~8.4.4 To qualify for the notation **BoxMax** the following requirements must be satisfied:

a. The onboard lashing program is to be certified in accordance with LR's *Approval of ~~Strength and Stability~~ Container Securing Programs*.

b. Where alteration to the container stowage arrangements is proposed, the onboard lashing program is to be modified accordingly and details submitted for approval.

c. The operation of the onboard lashing program is to be verified by the Surveyors upon installation and at Annual and Periodical Surveys as required in *Pt 1, Ch 3 Periodical Survey Regulations*. An Operation Manual for the onboard lashing program is to be verified as being available on board.

Existing paragraph 8.4.4 has been renumbered 8.4.5.

Part 3, Chapter 9
Special Features

Existing Section 10 has been renumbered Section 11.

■ *Section 10*
Omission of hatch covers

10.1 Application

10.1.1 Where it is intended to omit hatch covers for one or more cargo holds, the requirements of this Section are to be complied with and the notation **Hatch Covers omitted in Hold (No(s) ...)** will be assigned. Attention is drawn to the *Guidance Notes for the Omission of Hatch Covers on General Cargo Ships* and *MSC Circ. 608 Rev.1.*

10.1.2 The requirements of this Section are applicable to container ships where one or more cargo holds are not fitted with hatch covers and general cargo ships where the hatch covers can be completely or partially removed.

10.1.3 The transport of solid bulk cargoes is not normally permitted without weathertight steel hatch covers.

10.1.4 Proposals for the omission of hatch covers are required to be agreed by the National Authority in order that an exemption from the Load Line Convention requirements for hatch covers can be obtained.

10.2 Loading due to water ingress

10.2.1 Proposals for the omission of hatch covers are to include details, established by model tests or alternative means, of the quantity of water likely to ingress the cargo holds under the worst sea-going and weather conditions, and the means by which it is to be efficiently and safely discharged. The guidelines given in *MSC Circ. 608 Rev.1* are an acceptable approach for container ships. For general cargo ships, attention is drawn to *Ch 1, 1.5 Intact stability 1.5.5* of the *Guidance Notes for the Omission of Hatch Covers on General Cargo Ships*. The approach taken to determine the water ingress is to be agreed with the Flag Administration.

10.2.2 For general cargo ships, the permeability of the cargo holds is to be taken as 0,9 (holds are assumed to be empty).

10.2.3 For container ships, the permeability of the holds is to be taken as 0,7 (fully loaded container holds).

10.2.4 The maximum head of water in the open holds need not be taken greater than 2 metres when considering strength aspects.

10.3 Longitudinal strength

10.3.1 For container ships, the requirements of *Pt 4, Ch 8, 16.11 Hull girder ultimate strength* are to be complied with where the still water vertical hull girder bending moment is to be calculated for the intact flooded condition, *see Pt 3, Ch 9, 10.2 Loading due to water ingress 10.2.1*, *Pt 3, Ch 9, 10.2 Loading due to water ingress 10.2.3* and *Pt 3, Ch 9, 10.2 Loading due to water ingress 10.2.4*.

10.3.2 For general cargo ships, the requirements of *Pt 3, Ch 4, 5 Hull bending strength* and *Pt 3, Ch 4, 6 Hull shear strength* are to be complied with where the still water vertical hull girder bending moments and shear forces are to be calculated for the intact flooded condition, *see Pt 3, Ch 9, 10.2 Loading due to water ingress 10.2.1*, *Pt 3, Ch 9, 10.2 Loading due to water ingress 10.2.2* and *Pt 3, Ch 9, 10.2 Loading due to water ingress 10.2.4*.

10.3.3 As an alternative to the requirements of *Pt 3, Ch 9, 10.3 Longitudinal strength 10.3.2*, increased strength limits can be assigned based on a service factor of 0,8 provided that a wave height limitation is placed on the ship for loading conditions where it is proposed to omit hatch covers. This wave height limitation is to correspond to the significant wave height assumed when determining the degree of water ingress and is not to be taken as greater than 8,5 metres. The descriptive note **OHCF()** is to be assigned where the wave height limitation is to be appended to the descriptive note within brackets. The strength limits are to be named ‘hatch coverless strength limits’.

10.4 Local strength

10.4.1 Transverse watertight bulkheads are to be assessed as deep tank bulkheads (including welding) up to a height corresponding to the expected water ingress plus 0,5 metres, i.e. if there is water ingress up to a height of 1,5 metres then the height to which the bulkhead is assessed as a deep tank bulkhead is 2 metres, *see also Pt 3, Ch 9, 10.2 Loading due to water ingress*.

10.4.2 Longitudinal watertight bulkheads are to be assessed as deep tank bulkheads (including welding) up to a height corresponding to the expected water ingress plus 0,5 metres, i.e. if there is water ingress up to a height of 1,5 metres then the height to which the bulkhead is assessed as a deep tank bulkhead is 2 metres.

10.4.3 For general cargo ships, the requirements of *Pt 3, Ch 3, 5.4 Design pressure for partially filled tanks* are to be complied with.

10.4.4 The loading on the inner bottom resulting from the combination of water and cargo loading is not to exceed the design loading. Special attention is to be paid to the point loading of unusual cargoes being carried by general cargo ships.

10.4.5 For container ships, where it is proposed to fit hatch covers on top of container stacks to act as wave breakers, the strength of the securing arrangements and hatch coaming is to be specially considered.

10.5 Loading manual and loading instrument

10.5.1 For general cargo ships, a section is to be included in the Loading Manual describing the circumstances under which hatch covers can be omitted. The information provided is to include any wave height limitations as well as the permitted design loading for the inner bottom for each cargo hold and the assumed water ingress. Guidance is also to be provided on how to determine whether the proposed loading of the inner bottom exceeds the design loading.

10.5.2 If the requirements of *Pt 3, Ch 9, 10.3 Longitudinal strength 10.3.3* are applicable then the hatch coverless strength limits are to be included in the loading manual in addition to the seagoing strength limits.

10.5.3 For general cargo ships, a loading instrument is to be installed on board the ship irrespective of the length of the ship, *see Pt 3, Ch 4, 8.3 Loading instrument*.

10.6 Freeing ports

10.6.1 If freeing ports are provided, they are to be fitted on both sides of each open cargo hold, subject to the following:

- the number, size and location of the freeing ports on each side of each open hold are to be sufficient to prevent the accumulation of water above the level defined in *Pt 3, Ch 9, 10.2 Loading due to water ingress*; and

- efficient means of closure to prevent the accidental ingress of water is to be provided. Such means shall be operated from above the freeboard deck. In the case of a ship operating in areas where icing is likely to occur, these arrangements are to be suitable to enable the freeing ports to operate efficiently under such conditions.

Part 3, Chapter 10
Welding and Structural Details

■ *Section 2*
Welding

2.9 Inspection of welds

2.9.11 For the items butt and seam welds in plating, shown in *Table 10.2.6 Checkpoint locations*, consideration may be given for a reduction in inspection frequency for welds where volumetric inspection and the quality assurance techniques applied indicate satisfactory quality.

Part 3, Chapter 11
Closing Arrangements for Shell, Deck and Bulkheads

■ *Section 9*
Watertight doors ~~in bulkheads below the freeboard deck~~

9.2 Watertight doors below the freeboard/bulkhead deck

Existing sub-Section 9.2 has been deleted in its entirety and replaced with the following:

9.2.1 Watertight doors are to be of equivalent strength to the unpierced bulkhead, efficiently constructed and fitted, and are to be of an approved design.

9.2.2 The scantlings of the watertight doors are to comply with *Pt 4, Ch 1, 9 Bulkheads* using the actual stiffener spacing of the door.

9.2.3 The scantlings of the frames of the watertight doors are to satisfy the requirements of watertight bulkheads given in item 5 of *Table 1.9.1 Watertight and deep tank bulkhead scantlings* taking into account the arrangement of door stiffeners and securing arrangements.

9.2.4 Watertight doors are to be fitted in accordance with all requirements relating to their mode of operation, location, provision of controls, means of indication, etc. as given in *Table 11.9.1 Watertight doors located below the freeboard/bulkhead deck*.

9.2.5 All watertight doors, except those which are to be permanently closed at sea, are to be capable of being opened and closed locally from both sides of the door with the ship listed to either side.

9.2.6 For passenger ships, the angle of list at which the door is to be capable of being operated is 15 degrees.

9.2.7 For cargo ships, the angle of list at which the door is to be capable of being operated is 30 degrees.

9.2.8 Where indicated in *Table 11.9.1 Watertight doors located below the freeboard/bulkhead deck*, watertight doors are to be capable of being remotely closed by power from the bridge. For passenger ships, watertight doors are also to be capable of being remotely closed by hand from a position above the bulkhead deck.

9.2.9 For tankers, where there is a permanent access from a pipe tunnel to the main pump room, the watertight door shall be capable of being manually closed from outside the main pump room entrance in addition to the requirements given in *Pt 3, Ch 11, 9.2 Watertight doors below the freeboard/bulkhead deck 9.2.8*.

9.2.10 Where indicated in *Table 11.9.1 Watertight doors located below the freeboard/bulkhead deck*, means are to be provided on the navigating bridge to indicate whether the watertight doors are open or closed. Doors which are normally closed at sea but not provided with means of remote closure are to have notices fixed to both sides of the doors stating, ‘To be kept closed at sea'. Doors which are to be permanently closed at sea are to have notices fixed to both sides stating, ‘Not to be opened at sea’.

9.2.11 All watertight doors are to be provided with an audible or visual alarm in accordance with the requirements of SOLAS - International Convention for the Safety of Life at Sea and applicable amendments, where indicated in *Table 11.9.1 Watertight doors located below the freeboard/bulkhead deck*.

9.2.12 Hinged watertight doors of approved pattern may be fitted in 'tween decks in approved positions. The hinges of these doors are to be fitted with gunmetal pins or gunmetal bushes.

9.2.13 The frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

9.2.14 Watertight doors are to be tested in accordance with the requirements of *Pt 3, Ch 1, 9 Procedures for testing tanks and tight boundaries*. The capability of the door to be opened/closed at the required angle of inclination is also to be confirmed, *see Pt 3, Ch 11, 9.2 Watertight doors below the freeboard/bulkhead deck 9.2.6* and *Pt 3, Ch 11, 9.2 Watertight doors below the freeboard/bulkhead deck 9.2.7*.

9.2.15 For large doors intended for use in the watertight subdivision boundaries of cargo spaces, structural analysis can be accepted in lieu of structural testing. Where such doors utilise gasket seals, a prototype pressure test to confirm that the compression of the gasket material is capable of accommodating any deflection revealed by the structural analysis is to be carried out.

9.2.16 The following leakage criteria is to be complied with:

- Doors with gaskets – no leakage;
- Doors with metallic sealing – max leakage 1 l/min.

9.2.17 Limited leakage can be accepted for structural tests on large doors located in cargo spaces employing gasket seals or guillotine doors located in conveyor tunnels as follows;

$$\textbf{Leakage rate (litre / min)} = \frac{(\boldsymbol{P} + \mathbf{4,572})\boldsymbol{h}^{\mathbf{3}}}{\mathbf{6568}}$$

where

P = perimeter of door opening in metres

h = test head of water in metres

Where *h* ≤ 6,10 metres, the leakage rate need not be taken greater than 0,375 l/min.

9.2.18 For doors on passenger ships which are normally open and used at sea or which become submerged at the equilibrium or intermediate waterline, *see Pt 3, Ch 1, 6.10 Damage waterlines*, a prototype test is to be conducted, on each side of the door, to check the satisfactory closing of the door against a force equivalent to water height of at least 1 metre above the sill on the centreline of the door.

Table 11.9.1 Watertight doors located below the freeboard/bulkhead deck

Usage at sea	Type	Remote closure	Remote indication	Alarm	Notice	Comments
Doors in internal watertight bulkheads						
Passenger ships						
Normally closed	Power operated, sliding	Yes	Yes	Yes (local)	No	Certain doors can be left open, *see SOLAS II-1/22.2* and IMO *MSC.1/Circ.1564*
Permanently closed	Sliding, hinged	No	No	No	Yes	*See* Notes 2 and 3
Cargo ships						
Used	Power operated, sliding	Yes	Yes	Yes (local)	No	
Normally closed	Sliding, hinged	No	Yes	No	Yes	*See* Note 1
Permanently closed	Sliding, hinged	No	No	No	Yes	*See* Note 2
Doors in external watertight boundaries below equilibrium or intermediate waterline						
Passenger ships						

Permanently closed	Sliding, hinged	No	No	No	Yes	*See* Note 3
Cargo ships						
Permanently closed	Sliding, hinged	No	Yes	No	Yes	*See* Note 3

Notes

Note *1.* If hinged, this door is to be of a quick acting or single action type.

Note *2.* Doors are to be fitted with a device which prevents unauthorised opening.

Note *3.* Passenger ships which have to comply with *SOLAS II-1/14.2* require an indicator on the navigation bridge to show automatically when each door is closed, and all door fastenings are secured.

Note *4.* Normally closed means doors are kept closed at sea but can be used if authorised and are to be closed again after use.

Note *5.* Used means that the door is in regular use and can be kept open provided that it is ready to be immediately closed.

9.3 Watertight doors at or above the freeboard/bulkhead deck

9.3.1 Watertight doors located above the freeboard/bulkhead deck are to be in accordance with *Pt 3, Ch 11, 9.2 Watertight doors below the freeboard/bulkhead deck* except as amended by this Section.

9.3.2 Watertight doors are to be fitted in accordance with all requirements relating to their mode of operation, location, provision of controls, means of indication, etc. as given in *Table 11.9.2 Watertight doors located at or above the freeboard/bulkhead deck*.

9.3.3 For passenger ships, where it is required for a door to be watertight in order to meet damage stability requirements and such doors are located above the worst final and worst intermediate waterline, but where the door is fully or partly below the intermittent waterline, *see Pt 3, Ch 1, 6.10 Damage waterlines*, such doors are to be power operated and remotely controlled sliding semi-watertight doors complying with the requirements of *Pt 3, Ch 11, 9.2 Watertight doors below the freeboard/bulkhead deck* except that the scantlings and sealing requirements are to be based on the maximum head of water corresponding to the intermittent waterline, *see Pt 3, Ch 3, 5.5 Flooded loads*.

Table 11.9.2 Watertight doors located at or above the freeboard/bulkhead deck

Usage at sea	Type	Remote closure	Remote indication	Alarm	Notice	Comments
Doors in internal watertight bulkheads						
Passenger ships						
Normally closed	Power operated, sliding Power operated, hinged	Yes	Yes	Yes (local)	No	*See* Note 5
	Sliding, hinged	No	Yes	No	Yes	*See* Note 1
	Sliding, hinged	No	Yes	Yes (remote)	Yes	Doors giving access to below Ro-Ro deck
Permanently closed	Sliding, hinged	No	Yes	Yes (remote)	Yes	*See* Notes 1 and 3
Cargo ships						
Used	Power operated, sliding	Yes	Yes	Yes (local)	No	*See* Notes 3 and 4
Normally closed	Sliding, hinged	No	Yes	No	Yes	*See* Note 1
Permanently closed	Sliding, hinged	No	No	No	Yes	*See* Note 2
Doors in external watertight boundaries below equilibrium or intermediate waterline						
Passenger ships						
Normally closed	Sliding hinged	No	Yes	No	Yes	*See* Note 1
	Sliding, hinged	No	Yes	Yes (remote)	Yes	Doors giving access to below Ro-Ro deck
Permanently closed	Sliding, hinged	No	No	No	Yes	*See* Note 2
Cargo ships						
Normally closed	Sliding, hinged	No	Yes	No	Yes	*See* Note 1

Permanently closed	Sliding, hinged	No	Yes	No	Yes	*See* Note 2
Notes						
Note *1.*	If hinged, this door is to be of a quick acting or single action type					
Note *2.*	Doors are to be fitted with a device which prevents unauthorised opening					
Note *3.*	Under ICLL 66, doors separating a main machinery space from a steering gear compartment can be a hinged quick acting type provided that the lower sill of such doors is above the summer load line and the doors remain closed at sea whilst not in use					
Note *4.*	Under MARPOL, hinged watertight doors can be accepted in watertight bulkheads in superstructure					
Note *5.*	For sliding semi-watertight doors, *see* *Pt 3, Ch 11, 9.3 Watertight doors at or above the freeboard/bulkhead deck 9.3.3*					

Part 3, Chapter 12
Ventilators, Air Pipes and Discharges

■ *Section 2*
Ventilators

2.3 Closing appliances

2.3.9 In order to limit the fire growth potential in every space of the ship, the main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate whether the inlet or outlet is open or closed. Unless required by SOLAS, *Chapter II-2, Part C, Regulation 9 - Containment of fire*, emergency generator room ventilators need to be fitted with such means of closing, only when the emergency generator room is fitted with a fixed gas fire-fighting system. Battery room ventilators are only to be fitted with a means of closing, whenever:

(a) the battery room does not open directly on to an exposed deck; or
(b) the ventilation opening for the battery room is required to be fitted with a closing device according to the Load Line Convention; or
(c) the battery room is fitted with a fixed gas ~~fire extinguishing~~ fire-extinguishing system.

Where a battery room ventilator is fitted with a closing device *see* *Pt 6, Ch 2, 12.5 Thermal management and ventilation 12.5.2*. The means of closing mentioned in this paragraph refers to closing appliances of ventilation inlets and outlets for minimising the potential fire growth. The requirements specified are distinct from those for weathertight closing appliances.

2.4 Machinery spaces

2.4.1 In general, ventilators necessary to continuously supply the machinery space are to have coamings of sufficient height to comply with *Pt 3, Ch 12, 2.3 Closing appliances 2.3.1* without having to fit weathertight closing appliances. Ventilators to emergency generator rooms are to be so positioned that weathertight closing appliances are not required.

2.4.2 Where due to ship size and arrangement this is not practicable, lesser heights for machinery space ventilator coamings fitted with weathertight closing appliances may be permitted by the ~~administration~~ Administration in combination with other suitable arrangements to ensure uninterrupted, adequate supply of ventilation to these spaces.

2.4.3 Where closing appliances are fitted as per *Pt 3, Ch 12, 2.3 Closing appliances 2.3.9* or *Pt 3, Ch 12, 2.4 Machinery spaces 2.4.2,* to ventilators serving emergency generator rooms or closable ventilation louvres are used for emergency generator rooms, the following requirements are to be applied in addition to the requirements of *Pt 3, Ch 12, 2.4 Machinery spaces 2.4.2*:

(a) Ventilation louvres and closing appliances may either be hand-operated or power-operated (hydraulic/pneumatic/electric) and are to be operable under a fire condition. Closing appliances, which automatically close in response to exposure to fire products, are not to be fitted on ventilators located at outside boundaries and serving emergency generator rooms.
(b) Hand-operated ventilation louvres and closing appliances are to be kept open during the normal operation of the vessel. Corresponding instruction notices are to be provided at the location where hand operation is provided.
(c) Power-operated ventilation louvres and closing appliances are to open automatically whenever the emergency generator is starting/in operation. Closed ventilation louvres and closing appliances are acceptable during normal operation of the vessel. In the event of power failure, the default position of the ventilation louvres or closing appliances is to be the open position.
(d) Ventilation openings are to be capable of being operated manually from a clearly marked safe position outside the space where the closing operation can be easily confirmed. The louvre status (open/closed) is to be indicated at this position. Such closing is not to be possible from any other remote position.

■ *Section 3*
Air and sounding pipes

3.3 Closing appliances

3.3.2 ~~Closing~~ In general, closing appliances are to be of an approved automatic type~~.~~ where, with the ship at its summer waterline, the openings are immersed at an angle of heel of 40° or, the angle of down flooding if this is less than 40° which may be agreed on the basis of stability requirements. On ships such as passenger ships where the angle of down flooding is greater than 40°, the extent of approved automatic type is to be suitably increased to extend up to the actual angle of down flooding.

3.3.3 Where the closing appliances are not of an automatic type, provision is to be made for relieving the vacuum when the tanks are being pumped out.

Existing paragraph 3.3.3has been renumbered 3.3.4.

Part 3, Chapter 13
Ship Control Systems

■ *Section 8*
Anchor windlass design and testing

8.12 Structural requirements associated with anchoring

8.12.1 The windlass or winch is to be efficiently bedded and secured to the deck. The thickness of the deck in way of the windlass or winch is to be increased and the supporting structure for the anchor windlass is to be examined for the brake holding loads specified by *Pt 3, Ch 13, 8.4 Windlass design*. The allowable stresses specified in *Table 13.8.2 Allowable stresses in windlass and chain stopper supporting structure* are to be used to derive the net scantlings of the supporting structure. The capability of the supporting structure to withstand buckling is also to be assessed. A corrosion addition of 2 mm is to be added to the net thickness derived. The structural design integrity of the bedplate is the responsibility of the Shipbuilder and windlass or winch manufacturer.

8.12.2 Where cables pass through stoppers, these stoppers are to be manufactured from ductile material and be designed to minimise the possibility of damage to, or snagging of, the cable. They are to be capable of withstanding without permanent deformation a load equal to 80 per cent of the Rule breaking load of the cable passing over them. The allowable stresses specified in *Table 13.8.2 Allowable stresses in windlass and chain stopper supporting structure* are to be used to derive the net scantlings of the supporting structure. The capability of the supporting structure to withstand buckling is also to be assessed. A corrosion addition of 2 mm is to be added to the net thickness derived.

Table 13.8.2 Allowable stresses in windlass and chain stopper supporting structure

	Permissible stress N/mm^2
Normal stress (*see* Note 1)	1,00 σ_0
Shear stress	0,58 σ_0
Combined stress (*see* Note 2)	1,00 σ_0
Symbols	
σ_0 = specified minimum yield stress, N/mm^2	
Note 1 Normal stress is defined as the sum of bending and axial stresses. Note 2 Combined stress refers to equivalent von Mises stress.	

8.13 Structural requirements for windlasses on exposed fore decks

(Part of only shown)

8.13.9 The windlass is to be efficiently bedded and secured to the deck. The thickness of the deck in way of the windlass is to be increased. Adequate stiffening of the deck in way of the windlass is to be provided. The scantlings of the supporting structure and deck are to be determined by additional calculations applying the weight of the windlass combined with the resultant force on the seat due to the application of the following design loads:

- P_x (as defined in *Pt 3, Ch 13, 8.13 Structural requirements for windlasses on exposed fore decks 8.13.4*);
- P_y;
- P_x and P_y combined~~;~~.

~~The allowable stresses given in *Table 13.8.3 Allowable stress in windlass supporting structure for green sea loading* are not to be exceeded.~~

The allowable stresses specified in *Table 13.8.2 Allowable stresses in windlass and chain stopper supporting structure* are to be used to derive the net scantlings of the supporting structure. The capability of the supporting structure to withstand buckling is also to be assessed. A corrosion addition of 2 mm is to be added to the net thickness derived.

Existing Table 13.8.3 Allowable stress in windlass supporting structure for green sea loading has been deleted.

Part 3, Chapter 14
Cargo Securing Arrangements

■ *Section 1*
General

1.2 Classification notations and descriptive notes

1.2.3 ~~The advantage of having an onboard lashing program to calculate forces acting on the stowage arrangement is highlighted. It is recommended that all ships carrying containers on a regular basis be equipped with such a tool~~. On container ships an approved onboard lashing program to calculate forces acting on the container stowage arrangement is to be provided, complying with this chapter. This may be an extension to the loading instrument covered under *Pt 3, Ch 4, 8.3 Loading instrument*. ~~It is recommended that the program be approved by LR. If the program to carry out lashing calculations is approved by LR and installed and maintained in accordance with the requirements of *Pt 3, Ch 4, 8.4 Onboard lashing program*, the~~ The ship will be eligible to be assigned the special features notation **BoxMax**, with one or more of the supplementary letters **V** and **W**. The notation **BoxMax(V,W)** may be supplemented with the letter **L** if the conditions for this notation are satisfied. **BoxMax** may be supplemented with the letter **M** if the conditions for this notation are satisfied.

1.2.4 Special consideration may be given to waiving the requirement for an onboard lashing program as required by *Pt 3, Ch 4, 8.4 Onboard lashing program 8.4.1* and *Pt 3, Ch 4, 1.2 Classification notations and descriptive notes 1.2.3.* e.g. For smaller container ships where the container securing arrangements are relatively straightforward.

Existing paragraphs 1.2.4 to 1.2.8 have been renumbered 1.2.5 to 1.2.9.

1.5 Plans and information required

1.5.2 For container securing arrangements, the following plans and information are to be submitted:

(a) General arrangement plan showing the disposition and design weights of the containers.
(b) Rule length.
(c) Details of materials, stiffness and scantling of lashing bridges including heights from base line, heights of bottom of bridge, heights of each tier.
(d) Details of green water protection including longitudinal, transverse and vertical extents.
~~(b)~~ (e) Details of materials, design, scantlings of cell guides structure~~, lashing bridges~~, pedestals, and other container securing arrangements, where fitted.
~~(c)~~ (f) Details of certification, including safe working load (SWL), of fixed and loose container securing fittings
(g) Details of twistlock height and separation clearances.
(h) Details of stacking cones and their arrangements in holds.
(i) Details of lashing rod diameters and dimensions in x, y and z directions.
~~(d)~~ (j) Plans of structure in way of fixed container securing fittings and arrangements.
~~(e)~~ (k) Design values of the following ship parameters for the container load departure and arrival conditions:
    (i) Moulded draught (T_{c})
    (ii) Transverse metacentric height (*GM*).
~~(f)~~ (l) Cargo Securing Manual, *see Pt, 3, Ch 14, 1.5 Plans and information required 1.5.3*.

■ *Section 3*
Loose container securing fittings, materials and testing

3.3 Prototype testing

3.3.1 Prototype tests are to be in accordance with *Pt 3, Ch 14, 2.3 Prototype testing 2.3.1*, except that *Table 14.3.1 Design breaking loads and proof loads for loose container securing fittings* and *Table 14.3.2 Test loads and test modes for loose container securing fittings* are to be applied in lieu of *Table 14.2.1 Design breaking loads and proof loads for fixed cargo securing fittings* and *Table 14.2.2 Test loads and test modes for fixed container securing fittings* respectively. ~~For vertical lashing, *see Pt 3, Ch 14, 5.4 Containers in more than two tiers 5.4.9.(b)*.~~

■ *Section 5*
Container securing arrangements for stowage on exposed decks without cell guides

5.4 Containers in more than two tiers

5.4.9 When vertical lashings are used in combination with container securing fittings, consideration is to be given to the vertical clearances between the fittings and the container corner castings~~:~~.

~~(a) The lashing assembly is to remain elastic when subject to an elongation equating to the number of interface fittings fitted below the point where the vertical lashing is applied to the stack. In order to avoid overstressing of the rod and the turnbuckle, provision of spring or elastic elements incorporated into the turnbuckle may be advantageous. When lashing from lashing bridge level, the number of interfaces is to be counted down to the level where the lowest container is resting. The lashing rod~~

~~is to be fitted to the bottom casting of the container. For container securing fittings having design clearances in accordance with ISO 3874, a nominal clearance per fitting of 10 mm is to be taken to determine the total elongation of the lashing system. For fittings having clearances in excess of 10 mm, the total elongation is to be calculated, taking into consideration the higher clearances.~~

~~(b) A prototype test is to be carried out to demonstrate that the vertical lashing has a safe working load of 150 kN when elongated up to the calculated total design clearance plus 10 per cent without plastic deformation.~~

~~(c) It is recommended that the load-bearing effect of vertical lashing arrangements is to be explicitly taken into account when performing lashing calculations. Where this is not done, it is acceptable to either:~~

  ~~i. allow the permissible calculated lifting force to be increased to SWL+150 kN where SWL is the safe working load of the container securing fittings below the fitting position of the vertical lashing. The nominal lifting force for these fittings is not to exceed 400 kN at the securing fittings below the fitting position of the vertical lashing; or~~

  ii. ~~calculate the force in the lashing rod taking into account the lifting force at the rod connection point.~~

■ *Section 8*
Determination of forces for container securing arrangements

8.1 General

8.1.1 The forces acting in the securing system are to be determined for each loading condition and associated set of motions of the ship. ~~Although the operation of anti-roll devices or other systems may improve the behaviour of the ship in a seaway, the effect of such devices is not to be taken into account to reduce the determination of the forces for container securing arrangements.~~

8.1.4 Although the operation of anti-roll devices or other systems may improve the behaviour of the ship in a seaway, the effect of such devices is not normally to be taken into account to reduce the determination of the forces for container securing arrangements. Where the reliability of such systems can be demonstrated, special consideration of the roll motions will be given. Supporting documentation to demonstrate the effectiveness of an anti-rolling system should identify the redundancy incorporated in the control system and details of actual measurements from the ship over a period of time, including route and season of operation.

8.2 Ship motion, wind and green sea forces acting on containers

(Part only shown)

8.2.4 The individual force components for each Motion Case due to gravity, ship motions, wind and green seas acting on a container *i* are to be determined as follows, ~~see~~ *see Figure 14.1.1 Diagrammatic representation of symbols* and *Table 14.9.1 Acceleration force application*:

z_{bc} height above moulded draught, T_c, of the underside of the ~~lowest container in the outermost stack~~ stack under consideration, in m

(Part only shown)

8.2.7 Wind forces are to be applied to containers in inboard stacks if the centre of the windward side wall of the container is above the wind shear line, *see Figure 16.8.1 Application of wind forces*. The wind shear line is to be taken at an angle of 35 degrees to the horizontal and passing through upper deck at side, the upper outer edge of the hatch cover or the ~~upper~~ top corner of the uppermost container of any windward stack, as applicable, *see Figure 16.8.1 Application of wind forces*. The roll angle is to be ignored in the assessment of the wind shear line. The wind force is to be derived in accordance with *Pt 3, Ch 16, 8.2 Ship motion, wind and green sea forces acting on containers 8.2.4* but *see also Pt 3, Ch 16, 8.2 Ship motion, wind and green sea forces acting on containers 8.2.8*.

Hence wind forces are to be applied to containers in inboard stacks if:

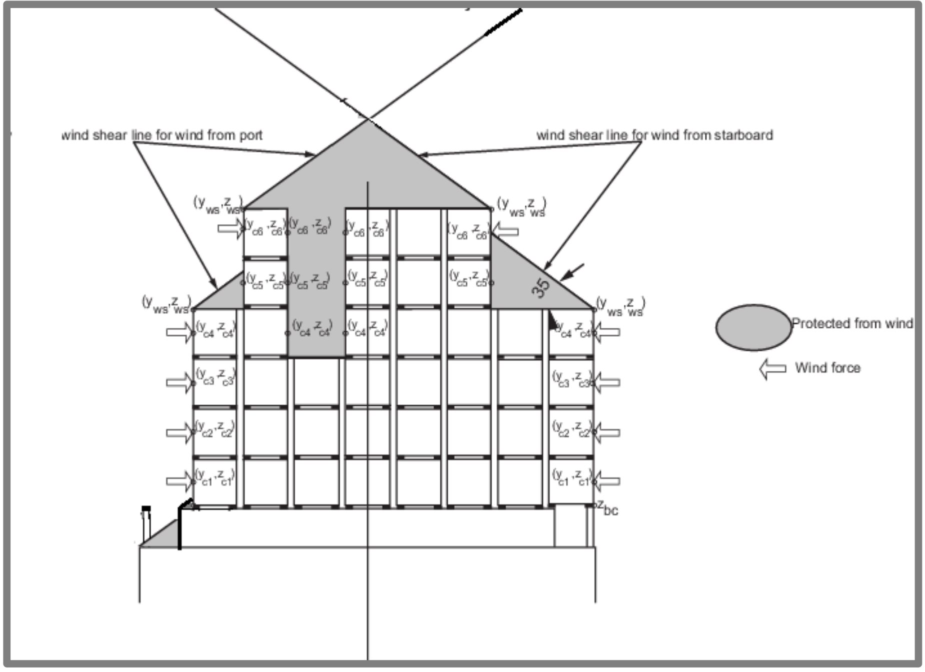
$$Z_{ci} > z_{ws} + (|y_{ws} - y_{ci}|) \tan(35)$$

Where:

y_{ws} is the transverse position of the windward upper deck at side, the upper outer edge of the hatch cover or the top corner of the uppermost container of the stacks windward of the stack under consideration as applicable

z_{ws} is the vertical position of the windward upper deck at side, the upper outer edge of the hatch cover or the top corner of the uppermost container of the stacks windward of the stack under consideration as applicable

Existing Figure 14.8.1 has been deleted and replaced with below;



Note. The formula in *Pt 3, Ch 16, 8.2 Ship motion, wind and green sea forces acting on containers 8.2.7* compares points at the container base and centre. The drawing compares points at the side. Both comparisons yield the same result.

Figure 14.8.1 Application of wind forces

■ *Section 9*
Strength of container securing arrangements

9.4 Allowable forces on containers, fittings and lashing devices

(Part only shown)

Table 14.9.6 Allowable forces in containers in stacks with the same base size

	20 ft	40 ft	45 ft
	in kN		
~~Horizontal force from a container casting acting parallel to the side face~~	~~150~~	~~150~~	~~150~~
~~Horizontal~~ Resultant horizontal force from lashing on lower container casting acting parallel to the end face~~, *see* Note 1~~	225	225	225
~~Vertical~~ Resultant vertical force from lashing on lower container casting acting parallel to the end or side face~~, *see* Note 1~~	250	250	250
Resultant force from lashing on lower container casting acting parallel to the end or side face	300	300	300
Resultant vertical force from lashing on upper container casting acting parallel to the end or side face	125	125	125
Resultant force from lashing on upper container casting acting parallel to the end or side face	188	188	188
Racking force on container end	150	150	150
Racking force on container side	~~150~~ 200	~~150~~ 200	~~150~~ 200
Vertical forces at each upper top corner casting, tension	250	250	250
Vertical forces at each lower bottom corner casting, tension	250	250	250
Vertical forces in each corner post, tension	375	375	375
Vertical forces at each top corner casting and in each corner post, compression	848 *see* Note ~~4~~2	848 *see* Note ~~4~~2	942
Vertical forces at each bottom corner casting, compression	848 + (1,8Rg/4) *see* Note 3	848 + (1,8Rg/4) *see* Note 3	942 + (1,8Rg)/4 ~~*see* Note 3~~
Transverse forces acting at the level of and parallel to the top face, tension or compression, *see* Note ~~2~~1	340	340	340
Transverse forces acting at the level of and parallel to the bottom face, tension or compression, *see* Note ~~2~~1	500	500	500
~~Note 1. In no case is the resultant of the horizontal and the vertical forces to exceed the limiting values derived from *Figure 16.9.2 Allowable forces for 20 ft or 40 ft containers constructed to ISO 1496-1:1990 including Amendment Nos. 1, 2 and 3*. The horizontal and vertical forces are the maximum components of a diagonal force and are not to be used as the maximum load if horizontal or vertical lashings are employed.~~			

Note ~~2~~1. Where a buttress supports the stack at an intermediate level, the total transverse force in the containers at the level is not to exceed the sum of the appropriate top and bottom forces.

~~Note 3. The vertical compression force on the lower corner casting on the closed end of the lowest container may exceed 848 + (1,8R_g/4) kN or 942 + (1,8R_g/4) as applicable, provided the following conditions are complied with:~~

- ~~a. The vertical compression force acting on the lowest container from the container above does not exceed 848 kN.~~
- ~~b. The horizontal racking force acting on the lowest container from the container above does not exceed 150 kN.~~
- ~~c. The local ship side or hatch cover container foundation is designed and approved for the increased design compression force.~~
- d. ~~The loose bottom container securing fittings should have a contact area fulfilling the requirements of *Pt 3, Ch 16, 3.2 Materials and design 3.2.5.*~~

Note ~~4~~2. Containers that are certified to comply with ISO 1496-1:1990 including Amendment 4 may have the top corner casting and post compression increased to 942 kN.

Note 3. Containers that are certified to comply with ISO 1496-1:1990 including Amendment 4 may have the bottom corner casting compression increased to 942 + (1,8Rg/4)

Existing figure 14.9.2 has been updated as shown below;

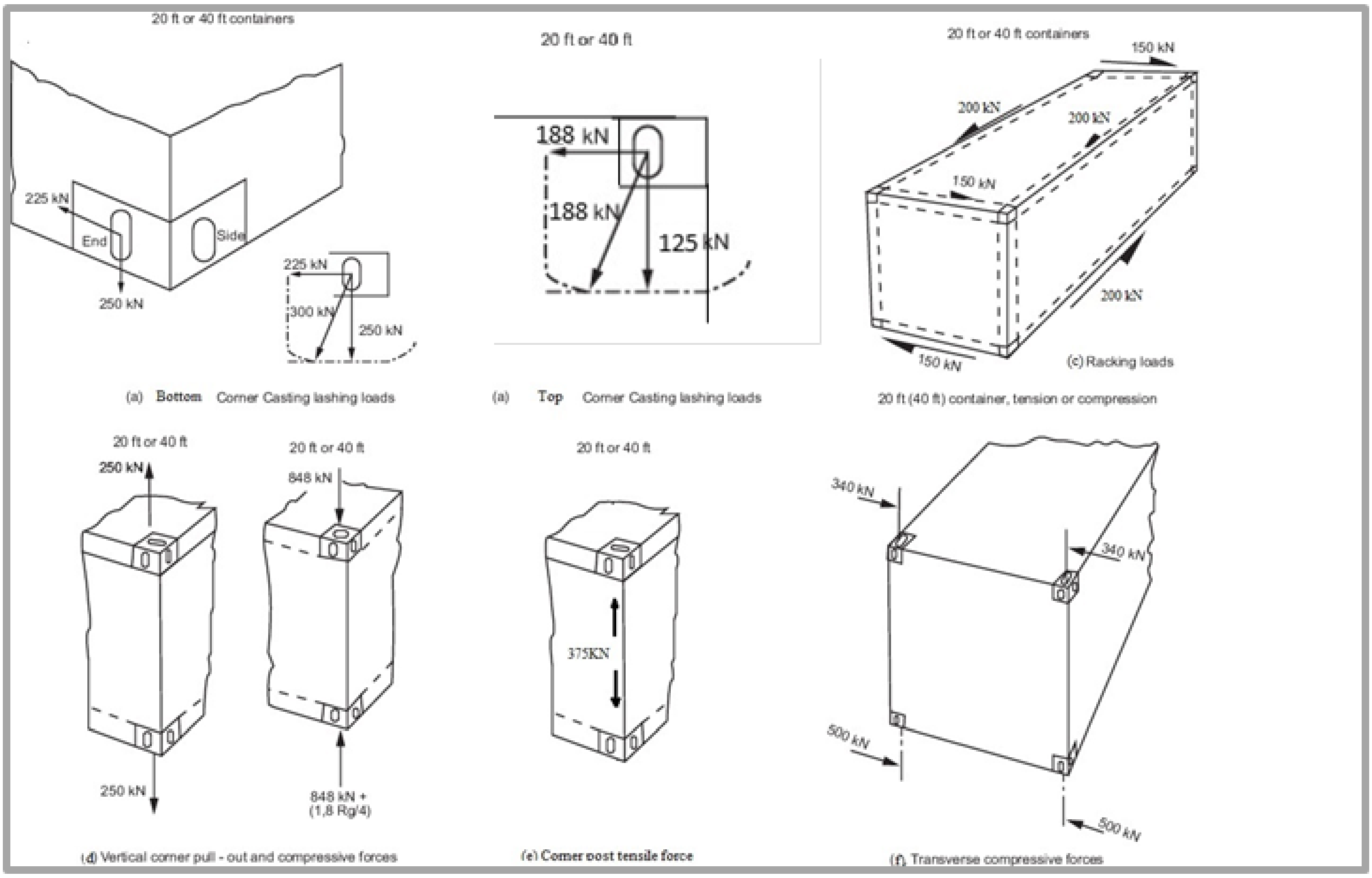

20 ft or 40 ft containers
225 kN
End
Side
250 kN
225 kN
300 kN
250 kN
(a) Bottom Corner Casting lashing loads
20 ft or 40 ft
188 kN
188 kN
125 kN
(a) Top Corner Casting lashing loads
20 ft or 40 ft containers
150 kN
200 kN
200 kN
150 kN
200 kN
150 kN
(c) Racking loads
20 ft (40 ft) container, tension or compression
20 ft or 40 ft
250 kN
250 kN
20 ft or 40 ft
848 kN
848 kN + (1,8 Rg/4)
(d) Vertical corner pull - out and compressive forces
20 ft or 40 ft
375KN
(e) Corner post tensile force
340 kN
340 kN
500 kN
500 kN
(f) Transverse compressive forces

Figure 14.9.2 Allowable forces for 20 ft or 40 ft containers constructed to ISO 1496-1:1990 including Amendment Nos. 1, 2 and 3

Part 4, Chapter 1
General Cargo Ships

■ *Section 3*
Longitudinal strength

3.1 General

3.1.2 The requirements of *Pt 3, Ch 4, 8.3 Loading instrument* regarding loading instruments are not applicable to general cargo ships under 120 m with the exception of ships with the notation **Hatch Covers omitted in Hold (No(s) ...)**.

■ *Section 9*
Bulkheads

9.4 Non-watertight bulkheads

Table 1.9.1 has been relocated to 9.2 Watertight and deep tank bulkheads.

(Part only shown)

Table 1.9.1 Watertight and deep tank bulkhead scantlings

h_4 = load head, in metres, measured as follows:

a. For watertight bulkhead plating, the distance vertically from a point one-third of the height of the plate above its lower edge to a point 0,91 m above the bulkhead deck at side or ~~perpendicular to the deepest equilibrium waterline in damaged condition obtained from applicable damage stability calculations~~ to the flooded load point, z_{FD}, whichever is the greater, *see also* *Figure 3.5.2 Heads for watertight and deep tank bulkheads*, ~~in Pt 3, Ch 3~~ in *Pt 3 Ship Structures (General)* and *Pt 3, Ch 3, 5.5 Flooded loads*.

b. For deep tank bulkhead plating, the distance from a point one-third of the height of the plate above its lower edge to the top of the tank, or half the distance to the top of the overflow, whichever is the greater, *see also* *Figure 3.5.2 Heads for watertight and deep tank bulkheads* in ~~Pt 3, Ch 3~~ *Pt 3 Ship Structures (General)*.

c. For watertight bulkhead stiffeners or girders, the distance vertically from the middle of the effective length to a point 0,91 m above the bulkhead deck at sideside, or ~~perpendicular to the deepest equilibrium waterline in damaged condition obtained from applicable damage stability calculations~~ to the flooded load point, z_{FD}, whichever is the greater, *see also* *Figure 3.5.2 Heads for watertight and deep tank bulkheads* ~~in Pt 3, Ch 3~~ in *Pt 3 Ship Structures (General)* and *Pt 3, Ch 3, 5.5 Flooded loads*.

d. For deep tank bulkhead stiffeners or girders, the distance from the middle of the effective length to the top of the tank, or half the distance to the top of the overflow, whichever is the greater, *see also* *Figure 3.5.2 Heads for watertight and deep tank bulkheads* in *Pt 3, Ship Structures (General)*.

■ *Section 10*
Hatch covers

10.1 General

10.1.1 The requirements of *Pt 3, Ch 11 Closing Arrangements for Shell, Deck and Bulkheads* are to be complied with.

10.2 Omission of hatch covers

10.1.1 Where it is proposed to omit hatch covers, the requirements of *Pt 3, Ch 9, 10 Omission of hatch covers* are to be complied with.

Part 4, Chapter 2
Ferries, Roll On-Roll Off Ships and Passenger Ships

■ *Section 7*
Peak, watertight and deep tank bulkheads

7.1 General

7.1.2 The load head, h_4, to be used in watertight bulkhead scantlings for passenger ships is, in addition, to comply with the following:

- For watertight bulkhead plating, the distance from a point one-third of the height of the plate above its lower edge to a point 0,91 m above the bulkhead deck at side, or to the deepest intermediate/equilibrium waterline in damaged condition obtained from applicable damage stability calculations, whichever is the greater~~.~~, *see also Figure 3.5.2 Heads for watertight and deep tank bulkheads* in *Pt 3 Ship Structures (General)* and *Pt 3, Ch 3, 5.5 Flooded loads*.

- For watertight bulkhead stiffeners or girders, the distance from the middle of the effective length to a point 0,91 m above the bulkhead deck at side, or to the deepest intermediate/equilibrium waterline in damaged condition obtained from applicable damage stability calculations, whichever is the greater~~.~~, *see also Figure 3.5.2 Heads for watertight and deep tank bulkheads* in *Pt 3 Ship Structures (General)* and *Pt 3, Ch 3, 5.5 Flooded loads*.

Part 4, Chapter 6
Trawlers and Fishing Vessels

■ *Section 1*
General

1.2 Assignment of load lines

1.2.3 Where a ship has been assigned zero freeboard, i.e. the design draught and the main deck coincide, the build-up of water on the main deck is to be prevented. In addition to the requirements of *Pt 3, Ch 8, 5.3 Freeing arrangements* and *Pt 3, Ch 12, 4 Scuppers and sanitary discharges*, further means of preventing the build-up of water such as, but not limited to, the fitting of partial bulkheads on the main deck and/or additional drainage requirements may be required in order to reduce free surface moments.

■ *Section 2*
Protection

2.1 Protection of steelwork

2.1.4 Where trawl winches are set back from the aft end, wear bars are to be fitted to minimise excessive wear resulting from the winch cables rubbing against the deck.

Part 4, Chapter 8
Container Ships

■ *Section 11*
Hatch covers

11.4 Omission of hatch covers

~~11.4.1 Proposals for the omission of hatch covers will be specially considered. Such proposals are to include details, established by model tests or alternative means, of the quantity of water likely to ingress the cargo holds under the worst sea-going and weather conditions, and the means by which it is to be efficiently and safely discharged. The proposals will also require to be agreed by the National Authority in order that an exemption from the Load Line Convention requirements for hatch covers may be obtained.~~ Where it is proposed to omit hatch covers, the requirements of *Pt 3, Ch 9, 10 Omission of hatch covers* are to be complied with.

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